IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Group Art Unit:	3677
Examiner:	Katherine Mitchell
Inventor:	Lutkus, William J.
Serial No.	10/829,101
Filed:	April 21, 2004
For:	Chromate Free Fluoropolymer Coated Fastener Inserts

APPLICANT'S AMENDED APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

This is an appeal from the Final Rejection mailed September 13, 2007, for which a Notice of Appeal was filed on November 6, 2007. The amended Brief is filed pursuant to a Notification of Non-Compliant Appeal Brief mailed May 8, 2009. In the amended brief, the Status of Claims is corrected to reflect the Final Rejection.

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TABLE OF AUTHORITIES

Real Party in Interest

The real party in interest is Newfrey, LLC of Newark, Delaware, to which the inventors have assigned all rights in this invention. The assignment was recorded in the United States Patent and Trademark Office on August 13, 2004, at reel/frame: 015685/0929.

Related Appeals and Interferences

There are no related appeals or interferences.

Status of Claims

Claims 11-21 and 23-27 are pending in the application. Claims 1-10, 22, and 28 are cancelled. Claims 11-21 and 23-27 are rejected. This appeal is taken as to all of the rejected claims.

Status of Amendments

There have been no amendments since the final rejection.

Summary of Claimed Subject Matter

The claims recite a coated metallic fastener insert ("insert") used in a fastener assembly. The insert is coated with a fluoropolymer composition. In an advance, the fluoropolymer composition is free of chromium. The chromium-free inserts perform better in a prevailing torque test than prior art inserts coated with a chromium containing fluoropolymer composition.

An embodiment of a fastener assembly according to the present invention is illustrated in Figures 1 and 2, taken from the current application. Figure 1 is an exploded view of the assembly and Figure 2 is a cross-section of the adjoined assembly.

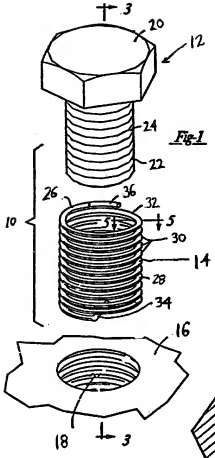

Fig-1

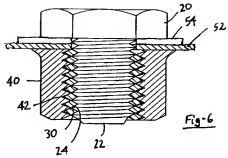

Fig-6

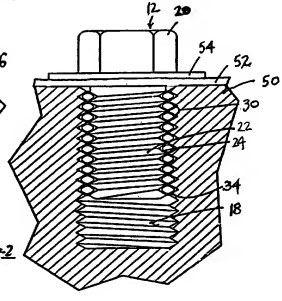

Fig-2

The fastener assembly **10** includes the insert **14**, a metallic fastener ("fastener") **20**, and a metallic substrate ("substrate") **16** that has a receiving element (shown in Figure 1 and Figure 2 as tapped hole **18)** for receiving the insert. One of the insert, fastener, and substrate is formed of a metal different from the metal of the other components.

The insert, claimed separately in claim 14, is a substantially cylindrical body of helically wound wire that has a bore **5** with a plurality of convolutions **30** for receiving the fastener. The outer surface of the insert is coated with a chromate free fluoropolymer composition. The coating precludes galvanic corrosion with the fastener assembly. Tanged inserts have a tang **34**, which is used to facilitate installing the insert into a tapped hole. Once the insert is installed, the tang is broken off with a tool.

In all embodiments, an insert coated with a chromate free fluoropolymer performs better in a prevailing torque test than an insert coated with a prior art chromate containing coating, especially when the torque test is performed on tangless inserts.

The main claims are mapped to the specification and Figures (37 CFR §41.37(c)(v)) as follows:

Claim	Support in Specification and Figures
11. (previously presented) A fastener assembly comprising: a threaded fastener formed from a first metal; a metallic fastener insert; and a receiving element; wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;	[0023] Referring to Fig. 1, there is shown a fastener assembly 10 including a threaded fastener 12 and a fastener insert 14 insertable within a tapped hole 18 of a substrate 50. [0007] In view of the foregoing, the present invention relates to a method for preventing galvanic corrosion in fastener assemblies employing a metallic fastener insert and a fastener for use in a receiving element, said method comprising the steps of: a) providing a fastener and a fastener insert for retaining the fastener within said receiving element; b) coating said fastener insert with a chromate free fluoropolymer composition; and

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test.	c) adjoining the fastener and coated fastener insert within said receiving element. [0026] Prior to inserting the fastener insert 14 within the tapped hole 18 or nut barrel 42, if the receiving element 16 is in the form of a locking nut 40, the insert is coated with a chromate free resin bonded fluoropolymer composition such as XYLAN® 5230, available from Whitford Corporation of Westchester, Pennsylvania, by way of non-limiting example. [0029] Interestingly, the chromate free fluoropolymer coated-fastener inserts of he present invention appear to have a smoother finish than those coated with the chromate inclusive compositions. Despite the smoother finish, the chromate free fluoropolymer coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangles inserts. This is unexpected in that a smoother finish would normally dictate a propensity for movement of a fastener insert within a tapped hole wherein all operating parameters are the same, which was not the case.
14. (previously presented) A coated metallic fastener insert of a fastener assembly including metallic fastener and a receiving element for said fastener insert, at least one of said insert, fastener and receiving element	[0024] ….. The fastener insert **14** may be of any form capable of retaining the fastener within the receiving element 16 such as a tapped hole 18 of a substrate 50, but preferably is in the form of a helically wound wire 26 including a body 28 having a plurality of convolutions 30 disposed between first and

being formed from a metal alloy which is different from the metal of the other of said insert, fastener or substrate, said insert comprising: a substantially cylindrical body of helically would wire including a plurality of convolutions wherein the outer surface is coated with a chromate free fluoropolymer composition to preclude galvanic corrosion within said fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test using tangless inserts.	second ends, 32 and 34, respectively. At least one of the ends may be provided with a selectively removable driving tang 36 for assistance in the installation of the insert within a tapped hole. [0029] … Despite the smoother finish, the chromate free fluoropolymer coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangles inserts.
23. A fastener assembly comprising: a threaded fastener formed from a first metal; a metallic fastener insert; and a receiving element; wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;	[0023] Referring to Fig. 1, there is shown a fastener assembly 10 including a threaded fastener 12 and a fastener insert 14 insertable within a tapped hole 18 of a substrate 50. [0026]Prior to inserting the fastener insert 14 within the tapped hole 18 or nut barrel 42, if the receiving element 16 is in the form of a locking nut 40, the insert is coated with a chromate free resin bonded fluoropolymer composition such as XYLAN® 5230, available from Whitford Corporation of Westchester, Pennsylvania, by way of non-limiting example. [0004] While such helically coiled wire inserts are generally useful as anchoring mechanisms for threaded fasteners, in order to be used in high strength applications such inserts must be formed from high strength metals such as 302/304 stainless steel. The use

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly.	of stainless steel inserts in fastener assemblies wherein the nut and/or fasteners are formed from other alloys leads to certain perceived problems such as the possibility of galvanic corrosion occurring over time. By the phrase "galvanic corrosion", it is meant the electrochemical corrosion resulting from the current caused in a galvanic cell between two dissimilar metals in an electrolyte because of the difference in potential (emf) of the two metals.

Grounds of Rejection to be reviewed on Appeal

I. Claims 11-21 and 23-27 are rejected as obvious over the Lutkus reference (US 6,224,311) in view of the Whitford Paper (Whitford Worldwide's "11 Reasons why Chromium-free Xylan® 5230 is specified by DaimlerChrysler, Ford, and General Motors).

Argument

I. The Examiner has established a prima facie case of obviousness of the novel claims on the basis of the Lutkus reference and the Whitford paper

The claimed subject matter represents an improvement of Applicants' earlier work described in the Lutkus reference (US 6,224,311) cited by the Examiner. In the reference, a helical insert is coated with a fluoropolymer composition in order to avoid galvanic corrosion. In the case on Appeal, the claimed improvement is based on the discovery that when the fluoropolymer contains no chromium, the coated inserts and the fastener systems have surprising advantages. In particular, the chromium-free inserts perform better in a prevailing torque test than the prior art inserts of the Lutkus reference coated with fluoropolymer.

Claims to the novel subject matter are rejected as obvious over a combination of the Lutkus reference and the Whitford paper. In the Final Rejection on page 3, the Examiner properly lays out the content of the primary reference and its deficiencies:

> "Lutkus USP 6224311 teaches a fastener assembly comprising a threaded fastener ... a metallic fastener insert [and] a receiving element ... . However, [the reference] is not specific that the fluoropolymer coating is chromate free."

The Examiner then describes the teaching of the secondary reference and why a person of skill in the art would combine the primary and secondary references:

> "Whitford paper teaches the desirability of a chromate free coating to meet the US's "end of Life" Vehicle directive 2000/53/EC, further teaching that DaimlerChrysler, Ford, and General Motors all require such a chromate free coating for their fasteners. ... One would have been motivated to make such a combination because immediate Market acceptance would have been obtained, as taught/suggested by Whitford paper. Further, compliance with environmental and purchasing standards would be met."

Later, the Examiner states: "the motivation to combine Lutkus and the chromate free coating of the Whitford paper is to comply with production and environmental requirements."

Applicants concede that a *prima facie* case of obviousness of the novel claims is made out on the basis of the cited references.

II. Evidence of unexpected results rebuts the *prima facie* case, but the examiner is considering it only for the propriety of the *prima facie* case.

The record reflects that Applicants' evidence of unexpected results is being improperly analyzed for its ability to prove there is no *prima facie* case of obviousness based on motivation to combine the cited references. Applicants have acknowledged that a *prima facie* case is properly made out, but are offering the declaration evidence in rebuttal. The prosecution of the claims is now discussed with this in mind.

The surprising advantages provided by the novel inserts and fastener assemblies of the claims are described in the specification, and are particularly discussed in view of the inventors' earlier work in the Lutkus reference. At paragraph 0006, Applicants state:

> "Recently, ...fastener inserts have been coated with certain resin bonded fluoropolymer compositions. Examples ... are described in U.S. Patent No. 6,224,311 ... . While generally useful, fastener inserts coated with the fluoropolymer compositions described in this document present additional challenges. For example, tangless... inserts coated with fluoropolymer compositions including chromates have been found to move incidentally within a tapped hole during prevailing torque testing."

Later at paragraph 0029, Applicants state:

> Interestingly, the chromate free fluoropolymer coated-fastener inserts of the present invention appear to have a smoother finish than those coated with the chromate inclusive compositions. Despite the smoother finish, the chromate free fluoropolymer

> coated fastener inserts perform better than fastener inserts coated with chromate inclusive fluoropolymer compositions during prevailing torque test conducted using tangless inserts. This is unexpected in that a smoother finish would normally dictate a propensity for movement of a fastener insert within a tapped hole wherein all operating parameters are the same, which was not the case.

The advantage in prevailing torque testing on tangless inserts is recited in rejected independent claims 11 and 14.

During prosecution, Applicants have offered two declarations by inventor William Lutkus, further describing the surprising results and the superiority of the claimed inserts in a prevailing torque test. Throughout, Applicants have requested that the evidence offered in declarations Lutkus I and Lutkus II be considered to rebut the *prima facie* case of obviousness based on the cited references. Applicants are not attacking the sufficiency or propriety of the *prima facie* case.

On August 4, 2006, Applicants offered a first declaration under 37 CFR 1.132 (Lutkus I). Mr. Lutkus described how the unexpectedly better results in the prevailing torque were discovered, and how the improvements, while subtle, were nevertheless significant. At section 12, he states:

> "I conclude based on the above data that inserts coated with the chromate free coatings such as claimed in the current application exhibit a surprising improvement over inserts coated with the chromate containing coating. The observed improvement is, if anything, somewhat more noticeable when the test is run on tangless inserts. This observation was completely unexpected. By coating inserts with the chromate free coating of the invention, both tanged and tangless inserts can be produced that comply with the requirements of Standard Industry test methods such as the Heli-Coil® Standard PP-3." Emphasis added.

Along with the declaration, Applicants stated in the accompanying amendment that

> "In order to advance prosecution, Applicants offer the enclosed Declaration under 37 CFR § 1.132 of Mr. William Lutkus, one of the inventors. Applicants respectfully request that the evidence

> submitted therein of unexpected results be considered in order to overturn the *prima facie* case of obviousness established by combination of the Lutkus reference with the Whitford Paper." Amendment of November 10, 2006, page 13. Emphasis added

In the ensuing Final Rejection, the Examiner stated she "does not see this as convincing proof of unexpected results." Final Rejection February 27, 2007 section 5, page 6. But she continued that:

> "Once one is motivated to use chromate free coatings for environmental and marketing reasons, and does so, one would THEN inevitably realize any improved performance in the prevailing torque test, since identical structures perform identically." *Emphasis in original.* Id., section 6, page 7.

Then, in an Advisory Action, the Examiner states, in discussing the contents of the Lutkus I declaration:

> Regardless, it does not matter what other benefits are realized with chromate free coatings on the Lutkus fastener of US 6224311, the Whitford paper provides overwhelming motivation to use chromate free coatings on fasteners, ... and any other benefits would be inevitably realized once the chromate free coating was used." Emphasis added

Applicants submit the latter statement was an improper statement of the law, as developed further below.

In response, Applicants offered a second declaration under 37 CFR 1.132 (Lutkus II), reporting the results of new experiments that demonstrated even more clearly the surprising results achieved with the claimed novel inserts and fastener assemblies. In the accompanying amendment of August 28, 2007, on pages 7 and 8, Applicants stated:

> "The data presented in the attached Declaration show that there are significant and unexpected differences between inserts coated with the prior art coatings and those coated with the coatings of the current claims. Such a showing of unexpected

> results is consistent with Applicants' description of their invention and with the scope of the current claims.
>
> Based on the showing of unexpected results in the attached 2007 Declaration, Applicants respectfully request the prima facie case of obviousness be withdrawn." Emphasis added

Applicants reiterate the declaration evidence is being offered to rebut the *prima facie* case.

In the Final Rejection (the subject of this Appeal), the rebuttal evidence of Lutkus I and Lutkus II was not given any weight. Instead, the Examiner appears to totally discount the evidence because it does not overcome the motivation to combine the references, i.e. it does not overcome the *prima facie* case of obviousness. The error is illustrated in the following passages from the Final Rejection of September 13, 2007:

> "the fact that there may or may not be unexpected torque-test results is irrelevant." Section 4, page 6, emphasis added

> "Examiner agrees that if the only motivation to combine Lutkus and the Whitford paper were the performance of the coated inserts in a prevailing torque test, then the additional tests do indicate that there may be unexpected results in said tests. However, this is not germane in this situation. Examiner maintains that the motivation to combine Lutkus and the Whitford paper has nothing to do with performance in torque tests." Section 5, page 7, emphasis added.

Significantly, the passages in the Final Rejection state that the Lutkus II declaration "may" show unexpected results, but that the declaration is not being considered "in this situation" because the evidence is "irrelevant" and "not germane."

III. As a result, improper weight is given to the evidence of secondary factors, in violation of the obviousness analysis required under *Graham v. John Deere.*

The standard and procedure for determining the obviousness of novel claims is set out in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966). First, the differences between the claims and the prior art are determined and the level of skill in the art is considered. Objective evidence relevant to the question of obviousness must also be considered by Office personnel. *Id.* at 17-18, 148 USPQ at 467. The use of the so-called Graham factors as objective evidence has been recently affirmed in KSR International Co. v. Teleflex, Inc. 550 U.S. ____, 82 USPQ2d 1385 (2007).

As adapted to ex parte procedure, Graham is interpreted as placing the burden on the Patent Office to produce a factual basis for its rejection of a claim as obvious. *In re Warner,* 379 F.2d 1011, 1016, 154 USPQ 173, 177 (CCPA 1967) (cited in *In re Piasecki*, 745 F2d 1468, 223 USPQ 785 (Fed. Cir. 1984)). After a *prima facie* case of obviousness has been established, the burden of going forward shifts to the Applicant. Rebuttal is merely 'a showing of facts supporting the opposite conclusion,' and may relate to any of the Graham factors including the so-called secondary considerations. *Id.* at 1471, 223 USPQ at 788, internal citations omitted. Regardless of whether the prima facie case would have been characterized as strong or weak, the examiner must consider all of the evidence anew. *Id.*

In apparent violation of the analysis required under *Graham v. John Deere,* and especially of its injunction to consider and weigh all evidence relevant to obviousness,

and in particular to weigh all the rebuttal evidence regardless of the whether the *prima facie* case is considered a strong one, the record reflects that rebuttal evidence that tends to overcome the *prima facie* case was not properly considered. Instead, the record reflects that the evidence of unexpected results presented in Lutkus I and Lutkus II was considered as "irrelevant" and "not germane," and to "not matter."

IV. When all the evidence, including the secondary factors discussed in the declaration, is properly considered, the claims are non-obvious.

If rebuttal evidence in the declarations is properly weighed along with the evidence supporting the *prima facie* case, the novel claims are non-obvious in light of the cited art. In the face of the *prima facie* case established by the Examiner, applicant has shown that the results obtained are surprisingly good, and in a way that could not be expected or predicted on the basis of the prior art. Applicants demonstrate that inserts coated with the chromate free coating perform surprisingly well in a prevailing torque test, and that the result is more pronounced on tangless inserts. The inventors were the first to discover these benefits, and are entitled to patentable claims in exchange for disclosing the discovery to the public.

Inventor Lutkus explains in his two declarations that the results are highly significant in his field and lead to important technical advantages. Weighed along with other evidence, the showing of secondary factors is sufficient to rebut the prima facie case established by the Examiner.

For these and the other reasons discussed above, Applicant respectfully requests that the rejection of claims 11-21 and 23-27 be REVERSED.

Respectfully submitted,

Dated: October 5, 2009

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Claims Appendix

LISTING OF CLAIMS

1-10. (cancelled)

11. (previously presented) A fastener assembly comprising:

a threaded fastener formed from a first metal;

a metallic fastener insert; and

a receiving element;

wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test.

12. (original) The fastener assembly of Claim 11, wherein said coating has an average dry thickness of between about 0.3 to 0.5 mils.

13. (original) The fastener assembly insert of Claim 11, wherein said coating has an average viscosity at the time of application of between about 20 to 30 seconds at 25°C.

14. (previously presented) A coated metallic fastener insert of a fastener assembly including metallic fastener and a receiving element for said fastener insert, at least one of said insert, fastener and receiving element being formed from a metal alloy which is different from the metal of the other of said insert, fastener or substrate, said insert comprising:

a substantially cylindrical body of helically would wire including a plurality of convolutions wherein the outer surface is coated with a chromate free fluoropolymer composition to preclude galvanic corrosion within said fastener assembly, wherein compared with an insert coated with chromate-containing fluoropolymer composition, the insert coated with a chromate-free fluoropolymer composition performs better in a prevailing torque test using tangless inserts.

15. (original) The coated metallic fastener insert of claim 14, wherein said insert is formed from stainless steel.

16. (original) The coated metallic insert of claim 14, wherein said insert reduces galling of said fastener.

17. (original) The coated metallic fastener insert of claim 14, further comprising a primer applied to said insert prior to the application of said fluoropolymer composition.

18. (original) The coated metallic fastener insert of claim 14, wherein said coils of said insert provide 60° internal screw threads upon insertion within said tapped hole.

19. (previously presented) The coated metallic fastener insert of claim 14, wherein the insert is tangless.

20. (previously presented) The fastener assembly of claim 11, wherein the insert is tangless.

21. (new) The fastener assembly of claim 11, wherein the receiving element is a tapped hole.

22. (cancelled)

23. (previously presented) A fastener assembly comprising:

a threaded fastener formed from a first metal;

a metallic fastener insert; and

a receiving element;

wherein at least one of the metallic fastener inserts and the receiving element is formed from second metal;

whereby said fastener insert is coated with a chromate free fluoropolymer composition to reduce the potential occurrence of galvanic corrosion in the fastener assembly.

24. (previously presented) The fastener assembly of claim 23, wherein said coating has an average dry thickness of between about 0.3 to 0.5 mils.

25. (previously presented) The fastener assembly insert of claim 23, wherein said coating has an average viscosity at the time of application of between about 20 to 30 seconds at 25°C.

26. (previously presented) The fastener assembly of claim 23, wherein the insert is tangless.

27 (previously presented) The fastener assembly of claim 23, wherein the receiving element is a tapped hole.

28. (cancelled)

Evidence Appendix

1. Declaration under 37 CFR § 1.132 of

   William J. Lutkus dated August 4, 2006, entered December 21, 2006 21

2. Declaration under 37 CFR § 1.132 of

   William J. Lutkus dated August 27, 2007, entered August 28, 2007..... 29

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/829,101
Filing Date:	April 21, 2004
Applicant:	Lutkus
Group Art Unit:	3677
Examiner:	Katherine W. Mitchell
Title:	CHROMATE FREE FLUOROPOLYMER COATED FASTENER INSERTS
Attorney Docket:	0275G-000915 (formerly 0275M-000915)

Director of The United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Declaration Under 37 CFR § 1.132 of William J. Lutkus

1. I am a co-inventor of the subject matter of the above captioned application. I have 18 years of experience in the field of industrial fasteners and hold 8 patents. My industry experience includes 10 years activity on ASTM Committee B-18 and 10 years on SAE Standard Committee E-25.

2. I am also a co-inventor along with Mr. William Giannakakos of the subject matter U.S. 6,224,311, which is cited as prior art against the current application. I am familiar with the contents of the Final Rejection mailed December 22, 2005, and with the Amendment After Final and Request for Continued Examination filed by my attorneys on June 22, 2006.

3. My colleagues and workers in my field are well aware of the distinction between tanged and tangless inserts. The following Figures from a published US patent represent a tanged insert.

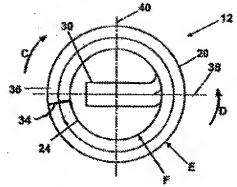


Fig. 2

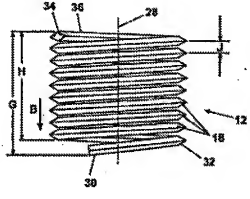


Fig. 3

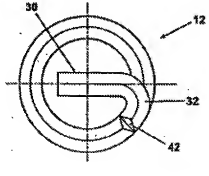


Fig. 4

The item marked 30 is the actual tang. The tang is used to install the insert into a tapped hole. An installation tool utilizes the tang to grab the insert and reduce the diameter as it threads it into the hole. Once the insert is installed to the correct depth the tool is removed and the tang is broken off using another tool.

4. Tangless inserts are well-known in my field. To illustrate, the Aerospace Industries Association (AIA) National Aerospace Standard NAS 1130 for tangless inserts is attached as Exhibit A.

5. To measure the performance of self locking inserts, a standard test method used in my field is the Heli-Coil® Standard PP-3. The standard method is commonly referred to in my field as a "prevailing torque test".

6. Successful performance of the prevailing torque test is exhibited if the torque values in each of the 15 cycles are within the minimum and maximum limits specified, and there is no movement of the insert in the tapped hole. Usually the torque values start out high and gradually decrease as the insert is subjected to additional cycles. The torque values must not be higher than the maximum allowed nor less than the minimum even after 15 cycles.

With tangless vs tanged, and with chromate vs chromate free, we have consistently observed differences in performance as discussed herein. Sometimes the differences in performance are rather subtle. But those in my field recognize that even small gains can be important. In practice, even a seemingly small improvement in performance can translate into significant commercial advantages.

Those in the industry who are familiar with tanged & tangless inserts are aware of the differences between these two types of inserts. Although they both must provide an acceptable female thread once installed, there are unique differences between the two in the way they are produced and the way they are installed. Both inserts are produced larger in diameter that the tapped hole in which they must be installed. This is what allows the insert to "seat" itself in the tapped hole and helps to prevent it from moving. The tangless insert is manufactured as small in diameter as allowed by the standards in order to be able to be installed.

The tanged insert utilizes a "tang" (see figure 4) for the purpose of installation. The installation tool "grabs" the tang and uses it to reduce the diameter slightly to "pull" the inserts into the tapped hole. The transition portion from the tang to the outside diameter of

the insert (#32 in fig 4) creates a gradual lead-in which helps to "thread" the insert into the tapped hole. Once the insert in completely installed in the tapped hole, the installation tool is retracted, allowing the insert to spring open fitting tightly within in the threads of the tapped hole. The tang is then broken off at the notch (#42 of Fig 4) using another tool. This removes the transition portion (#32) leaving a blunt end, just like the opposite end of the wire insert. This helps to keep the insert from moving.

The tangless insert is bi-directional and therefore has a small reduced turn on each end and the end of the wire is pointed or radius to provide a lead-in. Exhibit A clearly shows this unique end configuration on both ends of the insert. Each end also has a notch that is engaged by a special installation tool which makes use of the notch and the pointed reduced diameter end configuration to find the thread of the tapped hole and "pull" the insert into the tapped hole. Once installed the tool is removed allowing the insert to spring open to it's free diameter. The smaller free O.D., reduced turn on each end along with the pointed wire ends, do not provide the same retention of the tangless insert in the tapped hole as with a tanged insert.

Knowing these details, one can understand how coating a tangless insert with a fluoropolymer might create problems with installation and possibly movement. When tangless inserts were first coated with the chromate containing fluoropolymer, we did experience some problems with installation, and when torque tested, had more movement of the inserts than we experienced with the tanged product.

The chromate containing fluoropolymer, also affected how the tanged inserts performed during torque testing. We noticed higher torque readings especially on the first and second cycle. Occasionally some values exceeding the maximum allowable. We also experienced some movement problems but not significant.

After we found the new chromate free coating, we began experimenting using the tanged inserts. Once we found the process that would provide an acceptable coating for performance (galvanic corrosion protection),we started torque testing to ensure we could

meet the standard requirements. We were pleasantly surprised to find the initial torque readings (first/second cycle) were not as high as with the chromate containing coating. Also the range of torque values from 1st to 15th cycle was reduced and more consistent then the chromate containing coating.

Those particulars led us to experiment with the tangless inserts again. Using the new chromate free coating on the tangless inserts proved to be acceptable. Torque testing the tangless inserts with the new chromate free coating showed reduced initial torque values and we did not experience the occasional movement that we initially found with the chromate containing coating.

This created a coated insert with the same galvanic corrosion protection as the original coating without the harmful chromates and allowed us to use it successfully on tangless product.

7. When we invented the subject matter of the current application, we recognized that inserts coated with the claimed chromate free coatings contributed to reducing incidental movement of the inserts within fastener assemblies (see paragraph 0001 of our specification). We further described the state of the art in paragraph 0006 of our specification: we found that tangless inserts coated with chromate-containing fluoropolymer compositions moved incidentally within a tapped hole during prevailing torque testing. Thus, paragraph 0029 of our specification describes how chromate free fluoropolymer coated fastener inserts perform "better" than fastener inserts coated with chromate containing fluoropolymers during prevailing torque tests conducted on tangless inserts.

8. We also observed an improvement with tanged inserts, where the improvement was more subtle but nevertheless real and significant. Results are given in the table below. Sample inserts of various sizes are coated with chromate free (Xylan 5230) and chromate containing (Xylan 5251) PTFE coatings. Inserts were installed in aluminum torque test blocks and torque tested (15 cycles) in accordance with Heli-Coil® Standard PP-3. Data was recorded for each cycle and a comparison table is shown below.

Table I

SIZE	CHROMATE-FREE COATING		CHROMATE CONTAINING COATING	
	Movement	Torque	Movement	Torque
2-56	NONE	PASS	NONE	PASS
4-40	NONE	PASS	NONE	2 of 10 1st cycle high torque
6-32	NONE	PASS	NONE	PASS
8-32	NONE	PASS	NONE	PASS
10-32	NONE	PASS	1 of 10 ¼ turn movement	PASS
¼-28	NONE	PASS	NONE	PASS
5/16-24	NONE	PASS	NONE	PASS

9. Stainless steel inserts coated with the chromate free coating installed into aluminum torque test blocks with standard installation tools without any problems: torque tests in accordance with Heli-coil® Standard PP-3 were satisfactory for all samples (10 pieces for each size listed in the table). The minimum and maximum values were all within specification with no movement of the insert.

10. Comparison of torque values for the chromate-free vs. the chromate-containing coatings shows that a few samples of the latter exhibited slightly higher torque on the first cycle. Also, a small number of the tests showed movement of the insert. I conclude that the chromate free coating offers better and more reliable results when tested in the prevailing torque tests of Heli-Coil® Standard PP-3.

11. The data in the paragraph above were obtained on tanged inserts. When the test is carried out on tangless inserts coated with the chromate free coatings of this application vs. the chromate coatings of the prior art, the test results show even more differences than with the tanged inserts. When tested on tangless inserts, more of the test samples show movement of the insert, and more of the test samples exhibit torque that is outside of specification than are shown in Table I for the tanged inserts.

12. I conclude based on the above data that inserts coated with the chromate free coatings such as claimed in the current application exhibit a surprising improvement over inserts coated with the chromate containing coating. The observed improvement is, if anything, somewhat more noticeable when the test is run on tangless inserts. This observation was completely unexpected. By coating inserts with the chromate free coating of the invention, both tanged and tangless inserts can be produced that comply with the requirements of Standard Industry test methods such as the Heli-Coil® Standard PP-3.

13. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

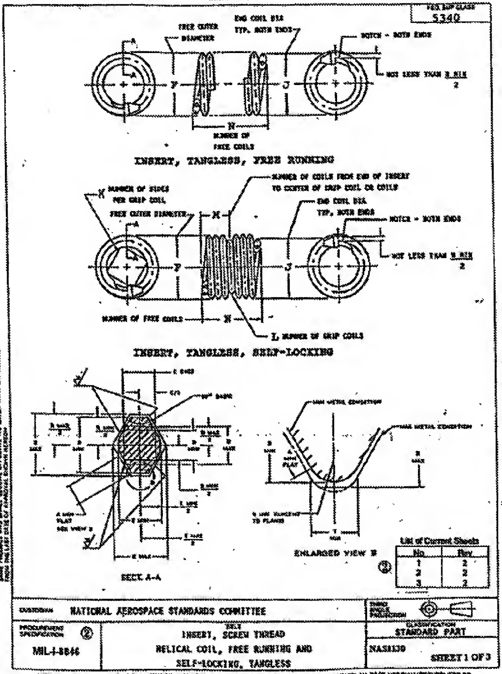
Dated: August 4, 2006 By: _____
William J. Lutkus

MAF/cg

EXHIBIT A

Aerospace Industries Association

NATIONAL AEROSPACE STANDARD



14520516.1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/829,101
Filing Date:	April 21, 2004
Applicant:	Lutkus
Group Art Unit:	3677
Examiner:	Katherine W. Mitchell
Title:	CHROMATE FREE FLUOROPOLYMER COATED FASTENER INSERTS
Attorney Docket:	0275G-000915 (formerly 0275M-000915)

Director of The United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Declaration Under 37 CFR § 1.132 of William J. Lutkus

1. I am a co-inventor of the subject matter of the above captioned application. I have 19 years of experience in the field of industrial fasteners and hold 8 patents. My industry experience includes 10 years or more of activity on ASTM Committee B-18 and on SAE Standard Committee E-25.

2. I am also a co-inventor along with Mr. William Giannakakos of the subject matter U.S. 6,224,311 ("the Lutkus reference"), which is cited as prior art against the current application. Mr. Giannakakos is also a co-inventor of the current application. I am familiar with prosecution of the current application, including the Final Rejection mailed December 22, 2005, the Amendment After Final and Request for Continued Examination filed June 22, 2006, the Non-final Office Action filed August 11, 2006, and the Final Rejection mailed February 28, 2007.

3. The claims of the current application recite PTFE coatings for inserts that provide unexpected benefits in comparison to the prior art PTFE coatings of the "Lutkus reference". One of the advantages described in the specification is that when the chromate-free coatings, as currently claimed, are coated onto tangless inserts, the inserts perform better in a "prevailing torque test" than those coated with chromate inclusive fluoropolymer compositions. This is described for example at paragraph [0029] of the specification and elsewhere.

4. In earlier prosecution I offered another Declaration under § 1.132 providing the results of torque testing on tanged and tangless inserts according to the industry standard "prevailing torque test". I wish to incorporate the entire Declaration of August 4, 2006 (2006 Declaration) into this Declaration by reference. Attention is respectfully drawn to the 2006 Declaration for its background, discussion of the industry standard testing, and data and discussion showing the differences between the chromate coated and chromate free fluoropolymer coated fastener inserts.

5. My understanding is that, although the 2006 Declaration described differences between the claimed insert systems and the prior art, the Examiner considered the showing of differences inadequate to support the claims we are now making to chromate-free coated insert systems. I understand that one reason for failing to persuade the Examiner was the relatively minor amount of differences between the two coatings.

6. In the 2006 Declaration, the data for the tanged inserts showed modest differences, representing subtle but significant superiority of the chromate free coatings. I reported that based on my experience, the differences with the tangless inserts were even more noticeable than the data shown with the tanged. I pointed out that a) even small differences were commercially and technically significant and b) that I considered the differences to be significant. That is still my position.

7. Upon reviewing the latest communication from the Examiner, I decided to carry out additional testing on tangless inserts that could demonstrate the improved performance in the prevailing torque test to an even greater degree that would be persuasive to the Examiner

in removing the rejections to the claims. This testing has now been completed and is reported below.

8. For this testing we chose five different sizes of tangless inserts to evaluate the effect of different coatings on the prevailing torque test. We chose the most popular sizes of inserts; those are sizes 2-56, 4-40, 6-32, 8-32, and 10-32.

Tangless inserts (screw locking 1 1/2 Dia) from the same lot of inserts were sent for coating with chromate containing and chromate-free PTFE coatings in accordance with our shop standards designated with SH262 and SH254. To run the prevailing torque test, five pieces each of the coated inserts were installed into torque test blocks and tested in accordance with PP 3-OR, the industry standard "prevailing torque test".

9. The prevailing torque test provides that the torque test shall be run at room temperature without lubricant, without axial load, and using the bolt and hole specified. The screw lock insert shall be installed in a torque test nut or block using recommended installation tools. The test bolt shall be cleaned with vythene before assembly to remove any oil or other contaminants. The bolt shall be assembled finger tight in the insert up to the first grip coil.

The bolt shall then be "installed" and "removed" from the assembled insert for 15 complete cycles without axial load. The bolt shall be considered fully "installed" when three threads extend past the end of the grip coils. Removal shall be considered complete when the bolt has been unscrewed to its original finger tight position.

The test shall be run at a rate slow to yield a dependable measure of torque and avoid heating of the bolt. A new hole, bolt, and insert shall be used for each complete 15 cycle torque test.

The test bolts shall be class 3A cadmium plated steel. The test holes shall be made in 2024 T4 aluminum and tapped to dimensions shown in MS33537, Class 3B.

The paragraphs above contain quotations from the PP 3-OR engineering standard.

10. We tested five sizes of tangless inserts coated with two different coatings. One tested set of five had a chromate containing coating such as provided in the "Lutkus reference". The other set of five inserts had a chromate-free PTFE coating. The chromate free inserts are the subject of the current application.

11. Out of the five sizes of inserts tested, all five sizes coated with the chromate containing "prior art" coating experienced a high initial torque. In the case of three of the sizes tested, the initial torque was so high that it represented a failure in the prevailing torque test, the first cycle torque being over the maximum allowable.

    In contrast, the torque results of the inserts coated with the chromate-free containing PTFE showed much more consistent torque readings from the first to the fifteenth cycle. All five sizes tested passed the torque requirements of the prevailing torque test.

12. As noted above, whether or not a size of insert exhibited a formal "fail" in the test, all of the torque readings with the prior art coatings were higher than the torque readings with the chromate-free coatings of the current invention. This is seen in the following table summarizing the data. Average torque readings in inch-ounces or in inch-pounds are given for the five sizes of tangless inserts coated. The left hand of the table reports the results for the chromate-free coatings of the current invention. The right side of the table reports the results for chromate containing coatings of the prior art. Prior art inserts exhibit significantly higher torque in every cycle. In addition, the torque range, which is the difference between the highest and lowest torque exhibited in any cycle, is much greater with the prior art inserts than with those of the current invention. All of these torque difference are significant in the industry and show that the chromate-free coated inserts of the current invention perform better in the prevailing torque test.

Table I

	Coating Of Current Invention				Prior Art Coating				ALLOWABLE TORQUE	
	Average Torque Readings (IN-OZ)			TORQUE	Average Torque Readings (IN-OZ)			TORQUE	MAXIMUM	MINIMUM
SIZE	1st Cycle	7th Cycle	15th Cycle	RANGE	1st Cycle	7th Cycle	15th Cycle	RANGE	TORQUE	TORQUE
2-56	11.5	9.7	8.6	2.9	26.2	14.3	9.4	12.1	20	3
4-40	18.6	16.0	13.0	5.6	37.6	20.3	18.2	19.4	48	10
6-32	62.6	52.4	41.8	20.8	118.6	82.0	73.2	45.6	96	16
8-32 *	4.0	3.7	3.3	0.7	10.0	6.5	6.2	3.5	9	1.5
10-32*	7.6	6.3	5.9	1.7	11.7	8.8	8.3	3.4	13	2
	* Torque values for 8-32 & 10-32 size inserts are in Inch- Pounds									

13. Not only does the above table show a dramatic improvement in average torque readings throughout the fifteen cycles, for three of the five inserts tested, the initial torque was so high that it failed the prevailing torque test. Thus, the 2-56, 6-32, and 8-32 tested inserts all failed the prevailing torque test by virtue of out of spec torque measurements on the first cycle. And as seen from the table, even the two that passed the "prevailing torque test" (those being the 4-40, and 10-32) exhibited significantly higher torque.

14. Unlike in the 2006 Declaration, none of the test inserts reported here failed by virtue of movement or slippage of the inserts. Nevertheless, the data indicate a clear difference in the prevailing torque test between tangless inserts coated with the prior art versus the current invention coatings.

14. The new data reported here demonstrates that the coated inserts of the current application perform significantly better in the industry standard prevailing torque test than coated inserts of the prior art. As developed throughout prosecution and in my 2006 Declaration, this result is significant and was unexpected. The results presented here, from newly generated data, show if anything an even more dramatic improved performance in the prevailing torque test.

15. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that I make these statements with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Dated: 8/27/2007

By: 
William J. Lutkus

MAF/cg

Related Proceedings Appendix

There have been no related appeals and interferences and therefore no related decisions exist.